

SINGLE PIPE INSTALLATION - 6 TO 1 SAFETY SLOPE

TABLE A - SCHEDULE OF PIPE SAFETY GRATES - AASHTO DESIGNATED PIPE SIZES

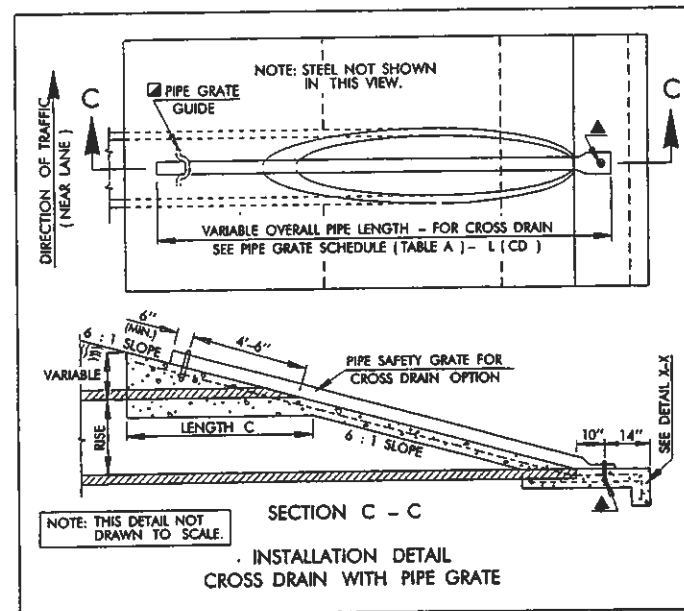
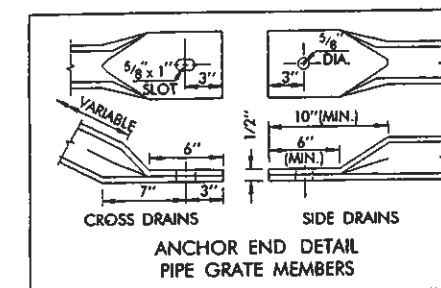
C. E. T. TYPE	ROUND INCHES	REINF. CONC. ARCH PIPE INCHES	STEEL ARCH PIPE INCHES	ALUMINUM ARCH PIPE INCHES	REINF. CONC. ELLIPTICAL PIPE INCHES	SIDE DRAIN GRATES L (SD) INCHES	CROSS DRAIN GRATES L (CD) INCHES	
								NUMBER OF HORIZONTAL PIPE GRATES FOR SIDE DRAIN OPTIONS
A6	15"					36"	NONE	
	18"					36"	NONE	
	(18")	22 x 13 1/2	2	21 x 15	2	21 x 15	2	42"
		26 x 15 1/2	2					45"
B6	21"					45"	NONE	
	24"					45"	NONE	
	(24")	28 1/2 x 18	3	28 x 20	3	28 x 20	3	48"
		36 1/4 x 22 1/2	4					54"
C6	30"					54"	1 @ 17'-6"	
	(30")	43 3/4 x 26 3/8	4	42 x 29	5	42 x 29	5	54"
		51 1/8 x 31 3/8	6					57"
	36"					57"	1 @ 18'-3"	
D6	42"					60"	NONE	
	(42")	58 1/2 x 36	7	57 x 38	7	57 x 38	7	64"
		65 x 40	7					64"
	48"					64"	1 @ 20'-9"	
E6	48"					66"	1 @ 21'-9"	
	(48")	73 x 45	8	71 x 47	9	71 x 47	9	70"
								70"
						72"	1 @ 22'-8"	
					72"	1 @ 23'-6"		
					74"	1 @ 24'-6"		
					76"	1 @ 25'-6"		
					78"	2 @ 26'-6"		
					80"	2 @ 28'-0"		
					82"	1 @ 30'-6"		
					84"	2 @ 28'-0"		
					86"	2 @ 30'-0"		
					88"	2 @ 30'-6"		
					90"	2 @ 30'-0"		
					92"	2 @ 30'-0"		
					94"	2 @ 30'-6"		
					96"	2 @ 30'-6"		

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TABLE B - SCHEDULE OF DIMENSIONS FOR C. E. T. TYPES

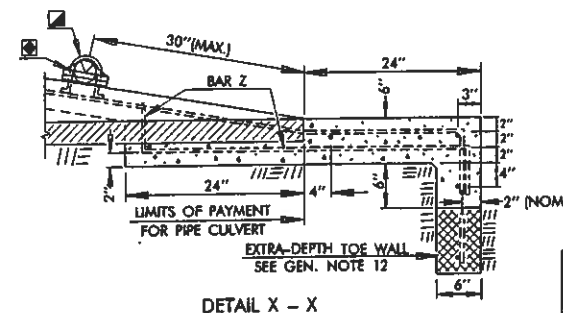
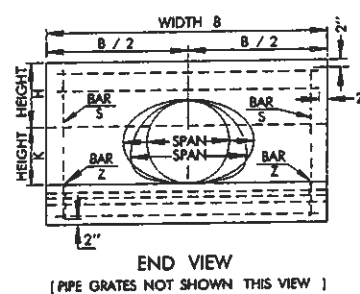
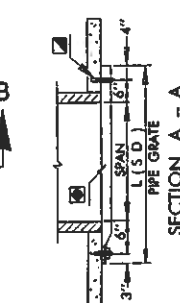
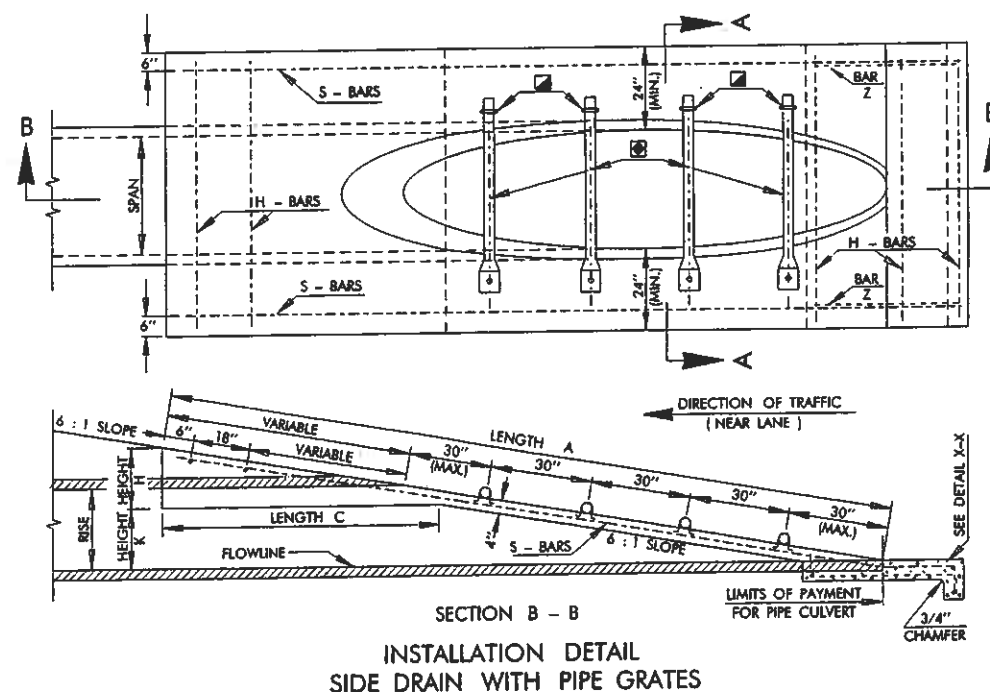
C.E.T. TYPE	LENGTH A	WIDTH B	WIDTH B	LENGTH C	HEIGHT H	HEIGHT K	STEEL LENGTH				
							CONC. C.Y.	CONC. C.Y.	H-BARS	H-BARS	S-BARS
A6	15'-3"	5'-6"	6'-6"	8'-6"	21"	9"	2.35	2.80	5'-2"	6'-2"	17'-9"
B6	18'-3"	6'-0"	7'-2"	9'-0"	22"	14"	2.75	3.49	5'-8"	6'-8"	21'-9"
C6	23'-4"	6'-6"	8'-5"	11'-0"	26"	20"	3.90	5.30	6'-2"	8'-1"	28'-4"
D6	27'-9"	7'-6"	9'-6"	12'-0"	28"	27"	4.85	7.00	7'-2"	9'-2"	33'-0"
E6	30'-6"	8'-0"	10'-4"	13'-0"	30"	30"	5.29	8.45	7'-8"	10'-0"	40'-6"

(R) ROUND SHAPE CULVERT OPTIONS
 (A) ARCH SHAPE CULVERT OPTIONS
 (E) HORIZONTAL ELLIPSE SHAPE CULVERT OPTIONS



- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 1999 ENGLISH STANDARD SPECIFICATIONS.
 - QUANTITIES SHOWN IN TABLE A ARE FOR ONE END ONLY. CLASS A CONCRETE SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF SECTION 509 OF THE 1999 ENGLISH STANDARD SPECIFICATIONS.
 - TYPES A6 THROUGH E6 END SECTIONS, AS SHOWN IN TABLE B, MAY BE USED WITH ANY AASHTO DESIGNATED METAL, ALUMINUM & CONCRETE PIPE SIZES, AS SHOWN IN TABLE A. END SECTION QUANTITIES ARE BASED ON METAL PIPE DIMENSIONS, NO PIPE WALL THICKNESS AND SMALLEST LISTED ROUND OR ARCH CULVERT PIPE WITHIN TYPE.
 - SLOPED END OF CULVERT PIPE SHALL BE SHIP CUT. TWO COATS OF COLD GALVANIZATION WILL BE APPLIED TO CUT EDGES OF STEEL CULVERT PIPE. COST OF CUTTING AND GALVANIZING IS INCLUDED IN THE PRICE BID FOR PIPE CULVERT.
 - ALL SIZES OF CULVERT PIPE WILL BE CUT ON 6 TO 1 SLOPE.
 - PIPE FOR SAFETY GRATES SHALL BE 3" x 7.58 LBS./FT. STANDARD WEIGHT STEEL PIPE, SCHEDULE 40. IT SHALL BE FURNISHED GALVANIZED, PLAIN END AND SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A-53 (HYDROSTATIC TESTS MAY BE WAIVED) OR ASTM F 1083. COST OF GRATES TO BE INCLUDED IN PRICE BID FOR THE C.E.T. OR ASTM F 1083. COST OF GRATES TO BE INCLUDED IN PRICE BID FOR THE C.E.T.
 - ANY GALVANIZED AREA(S) OF METAL PIPE DISTRESSED DURING THE POST FABRICATION AND/OR HANDLING PROCESS SHALL BE COATED WITH AN APPROVED ZINC RICH PAINT. COST OF STEEL SHALL BE INCLUDED IN PRICE BID FOR THE CULV. END TREATMENT.
 - REINFORCING STEEL AND PIPE GRATE GUIDES SHALL BE NO. 4 DEFORMED BARS. COST OF STEEL SHALL BE INCLUDED IN PRICE BID FOR THE CULV. END TREATMENT.
 - CRITERIA FOR USE OF PIPE SAFETY GRATE MEMBERS:
 - (A) ALL SIDE DRAIN AND MULTIPLE PIPE INSTALLATIONS WITHIN THE CLEAR ZONE.
 - (B) ALL CROSS DRAIN INSTALLATIONS WITH A CULVERT SPAN OF 30" OR MORE.
 - (C) ALL INSTALLATIONS OUTSIDE THE CLEAR ZONE WHERE HAZARD POTENTIAL IS HIGH BASED ON TRAFFIC DIRECTION, SPEED, VOLUME AND SIZE OF CULVERT.
 NOTE: ANALYZE HYDRAULIC PERFORMANCE AT VARYING DEGREES OF CLOGGING AND APPLY RISK ASSESSMENT BEFORE USING GRATES.
 - PIPE GRATE MEMBERS ARE NOT SHOWN IN END VIEW.
 - ANCHOR END OF PIPE GRATE MEMBERS SHALL BE HELD IN PLACE WITH A 1/2" x 5 1/2" GALVANIZED BOLT, NUT AND WASHER. THREADS, 1 3/4" (NOM.) SHALL REMAIN EXPOSED FOR INSTALLING GRATE, WASHER AND NUT. ALL BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A-307 WITH COST TO BE INCLUDED IN THE PRICE BID FOR THE CULVERT END TREATMENT.
 - FOR TOTAL QUANTITY OF EXTRA DEPTH TOE WALL, MULTIPLY WIDTH B TIMES 0.0185 FOR EACH FOOT OF DEPTH OF TOE WALL REQUIRED. PAYMENT TO BE INCLUDED IN PRICE BID FOR THE CULVERT END TREATMENT.
 - LONGITUDINAL PIPE SAFETY GRATES FOR CROSS DRAIN INSTALLATIONS ARE NOT NECESSARY OR REQUIRED FOR OPEN TRENCH/DITCH SPANS LESS THAN 30".

PRECAST CULVERT END TREATMENTS OR OTHER ALTERNATIVE DESIGNS MAY BE USED IF APPROPRIATE DRAWINGS ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.



TYPICAL ABBREVIATIONS

RS	- ROUND SIDE DRAIN
RC	- ROUND CROSS DRAIN
AS	- ARCH SIDE DRAIN
AC	- ARCH CROSS DRAIN
GR	- GRATED
NG	- NON-GRATED

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613.06(CC)	CULVERT END TREATMENT	EA.

- SPECIFY TYPE OF END TREATMENT (EXAMPLE: TYPE B6 CULVERT END TREATMENT)
- C. E. T. ORIENTATION AND SAFETY GRATE REQUIREMENTS SHALL BE SPECIFIED ON THE SUMMARY OF DRAINAGE STRUCTURES. (SEE TYPICAL ABBREVIATIONS.)

APPROVED BY ROADWAY ENGINEER *C.M. Sankouli* DATE 9/1/99

OKLAHOMA DEPT. OF TRANSPORTATION
ROADWAY STANDARD (ENGLISH)
CULVERT END TREATMENT
SINGLE PIPE INSTALLATION
6 TO 1 SAFETY SLOPE

1999 SPECIFICATIONS CET6S-2 OOE
R-80BE